METHODOLOGY OF ROAD TRANSPORT PLANNING WITH THE USE OF IT SOFTWARE IN TERMS OF MILITARY SECURITY MAINTENANCE

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Abstract. The study focuses on the generalization of the methodology of transport planning with the use of the LOGFAS IT system. The main activities that must be performed in order to plan the transport correctly in the IT software were presented. This process requires a lot of experience and work in many program modules and the implementation of a lot of different information without which planning is impossible.

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JEL Classifications: O10, O11

1. Introduction

The development of transport, including the improvement of its planning, affects economic development, and this clearly results in an increase in the national income (Nurzyńska, 2016, p. 110; Ivankova et al, 2021; Kostiuk et al., 2021; Periokaite, Dobrovolskiene, 2021; Nastisin et al., 2022).

One of the main challenges of the Ministry of National Defense is the improvement of the logistics management of the Polish Armed Forces. The implementation of LOGFAS software to the Armed Forces is certainly one of the paths that the Ministry of National Defense should follow.

The research problem of the article focuses on the answer to the question: What information and where should be entered into the IT system so that it is possible to perform transport planning?

The purpose of the work was outlined for the research problem. The aim of the study is to present the methodology of transport planning in the Polish Armed Forces with the use of the LOGFAS IT system, mainly in the CORSOM module. For such a research problem and the purpose of the work, a research hypothesis was outlined: Will the data entered into the LOGFAS IT system, including the CORSOM module, allow for the simulation of supplies in accordance with the introduced guidelines?

The subject of the research is information entered into the LOGFAS IT system, including the CORSOM module. The first substantive point was devoted to the analysis of the literature on the subject of the research.

2. Analysis of the literature on the subject of the research

In economic terms, transport means activities related to supply chain management and the paid provision of services in the field of: movement, storage, packaging, etc. (Stajniak et al., 2008, p. 8; Jurgilewicz et al., 2021; Jurgilewicz et al., 2022). J. Neider, on the other hand, claims that transport is the provision of services related to the movement of cargo or others directly related to it (Neider, 2008, p. 5). Another interpretation that describes transport as loading and handling activities can be found in the literature (Karbowiak, 2009, p. 7). M. Jacyna and K. Lewczuk, in turn, describe transport as the transport process and indicate that its goal is to cover the distance (Jacyna, Lewczuk, 2016, p. 88). In conclusion. the above interpretations indicate the meaning of the term "transport" which relates to the subject of this study.

The focus is on the first essential management function which is planning. It is a process of a conscious setting of directions for action and making decisions based on goals, facts and well-thought-out assessment (Barrow, Barrow, 1992, p. 28). Another interpretation indicates that the planning process is the first basic managerial function that must be performed in organizations (Griffin, 1998, p. 227). Koziński, on the other hand, believes that planning is conducted by managers and their staff supporting them with systematic and orderly setting of goals regarding the adopted time periods and the ways of achieving them by the entire institution or its internal organizational entities (Karwacki et al., 2003, p. 117).

Referring to the subject of the study, the definition which reflects most the transport planning in the Ministry of National Defense with the use of ADAMS and CORSOM is the one by J. Koziński which raises issues related to goals setting, times and methods of achieving the adopted goals (Karwacki et al., 2003, p. 117).

Transport planning in NATO, including in the Polish Armed Forces, is conducted with the use of LOGFAS (Logistics Functional Area Services) software, in its several modules - ADAMS, EVE and CORSOM. Logfas transport module responsible for planning is ADAMS (Allied Deployment and Movement System), for execution – EVE, and for final delivery from port of debarcation to final destination – CORSOM (Coalition Reception Staging and Onward Movement). Planning in LOGFAS 7 version is based on the construction of DDP plans (Detailed Deployment Plan) in which components are created, missions are formed and much more information is generated.

The work with ADAMS, EVE and CORSOM modules can be started when a logbase (logistic database) is created and activated in the LCM (Logfas Connection Manager) module. Additionally, in the LDM module (Logfas Data Management Module) in the Force Profile and Holdings tab, a profile with the created organizational structure in which Items should be placed must be developed. Moreover, National Parameter Sets and Plan should also be developed. Additionally, in the GEOMAN (Geographical Data Manager) module, networks need to be created on which the Items included in the plans are to move. Then, before the start of the ADAMS module, the SOR (Statement of Requirement) and AFL (Allied Force List) should be established in the LDM module. Additionally, material consumption planning should be introduced by the introduced Items (Kozicki, 2020; Kozicki, Brzeziński, 2017). Due to the non-intuitive and very extensive methodology of the entering of data into transport modules, the purpose of the study was outlined which is to show the methodology of transport planning mainly in the CORSOM module in terms of the maintenance of military security.

In the Dictionary of the Polish Language, security means the non-threatening, calm, and safe conditions (Szymczak, 1981, p. 147). One of the types of security important in terms of the subject of the study is military security.

According to W. Kitler, military security is a kind of national security, the main goal of which is to counteract external and internal threats that may lead to the threat of the use of military force to protect and defend against the resulted threats (Kitler, 2011, p. 47). The correct planning of transport in the LOGFAS environment in

the ADAMS, EVE and CORSOM modules supports the functioning of NATO countries, including the Polish Armed Forces, in terms of the maintenance of military security.

In the study, thanks to the use of the CORSOM module, a multidimensional comparative analysis was used, it is a group of statistical methods that simultaneously analyze at least two variables describing each examined object (Łuniewska, Tarczyński, 2006, p. 9). This analysis allows to make various comparisons of objects in order to detect their essential properties (Panek, Zwierzchowski, p. 15).

3. Transport planning with the use of IT software

Transport planning should start with a database in the LCM module. After that, the constructed base should be activated.

The next step is to create the profile in the LDM module and the organizational structure with ITEMS. There, the information about the *home station* should also be completed, national English name. In the case of ITEMS, the appropriate RIC and NIC should be selected and a national parameter set should be created.

Then, a plan is developed (Fig. 1).
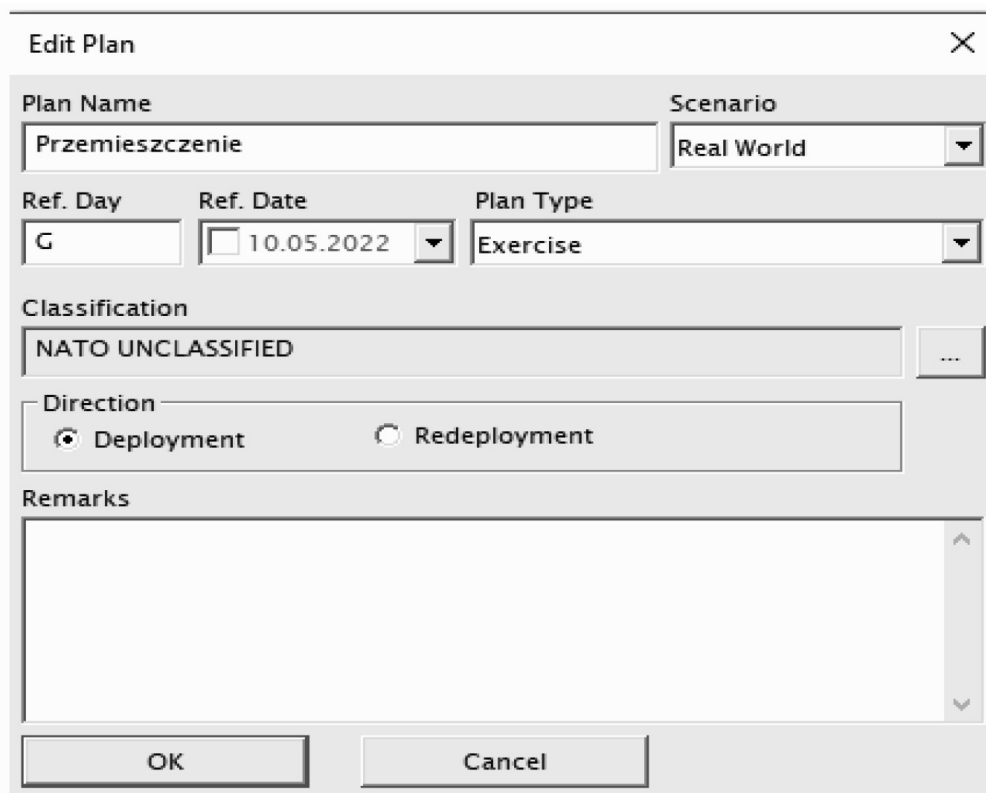
Figure. 1. Creating a plan in the LDM module

Source: own study

In the developed plan, the *refering day* should be indicated, the name of the plan and the direction of displacement (Fig. 1).

Then, the selection of sub-units responsible for procurement should be done. At a later stage, the methodology of the packing of products should be specified and the consumption standards of respective ITEMS supplemented with the use of RIC or NIC.

Then, the resources used by the divisions need to be indicated and the packing should be done using the existing functionalities.

SOR, ADL and AFL are then built. The further steps are to go to the ADAMS module and build the DDP. After its construction, conduct an inventory of resources, specify means of transport and build missions.

The next step is to go to the CORSOM module and run the already performed DDP in the ADAMS module.

The CORSOM module interacts with LOGBASE which provides information on various aspects that affect Reception Staging and Onward Movement (RSOM) processes, also known as Reception, Staging, Onward Movement and Integration (RSOI).

The CORSOM module is an application that is used to configure the RSOM infrastructure for military units transported in dynamic terms. Road and rail networks can be designed to assist the operator in determining the location of RSOM facilities and detailed support requirements. An example of road building is shown in Figure 1.
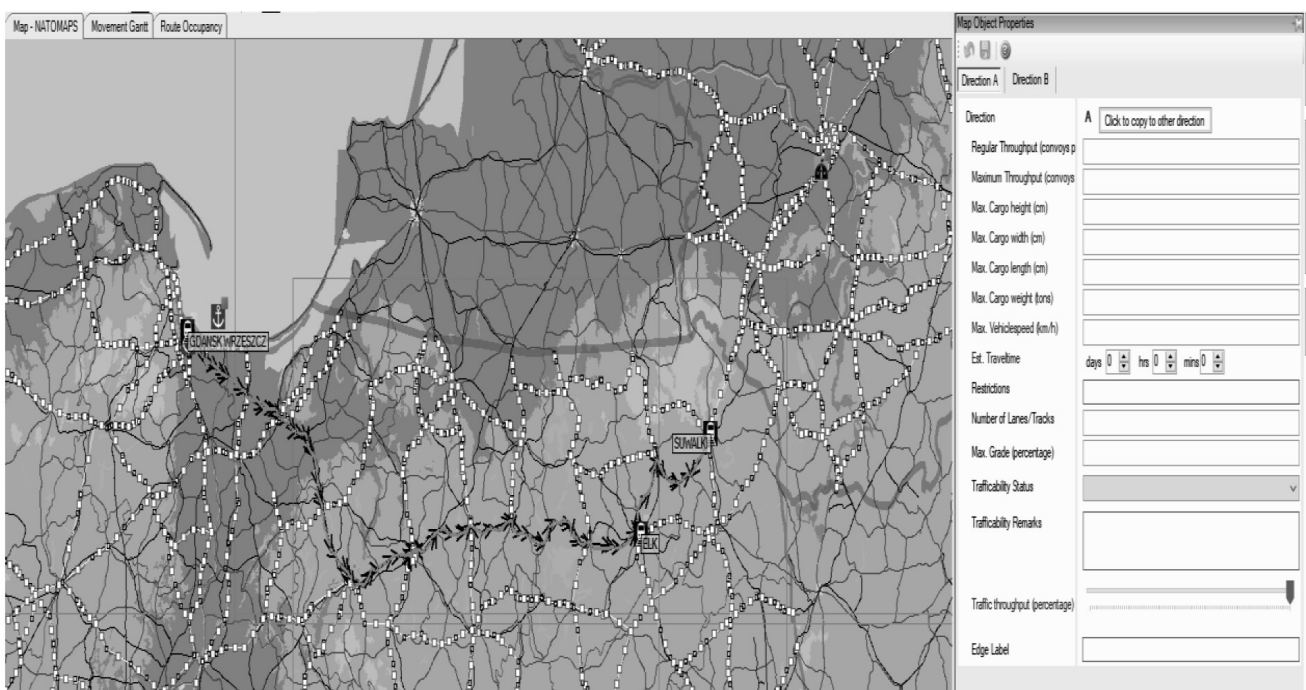
Figure 2. Building a road from Gdańsk-Wrzeszcz to Suwałki

Source: own study

Interconnected networks allow to create a road (*rout*). The respective elements of the network can be assigned the following parameters important in terms of displacement: maximum speed, maximum cargo, maximum length, width and weight of vehicles and others shown in Figure 2. Based on these parameters and assigned in CORSOM preferences, it is possible to create a path and analyze the time of displacement of subunits.

Examples of solutions for transport planning are presented below.
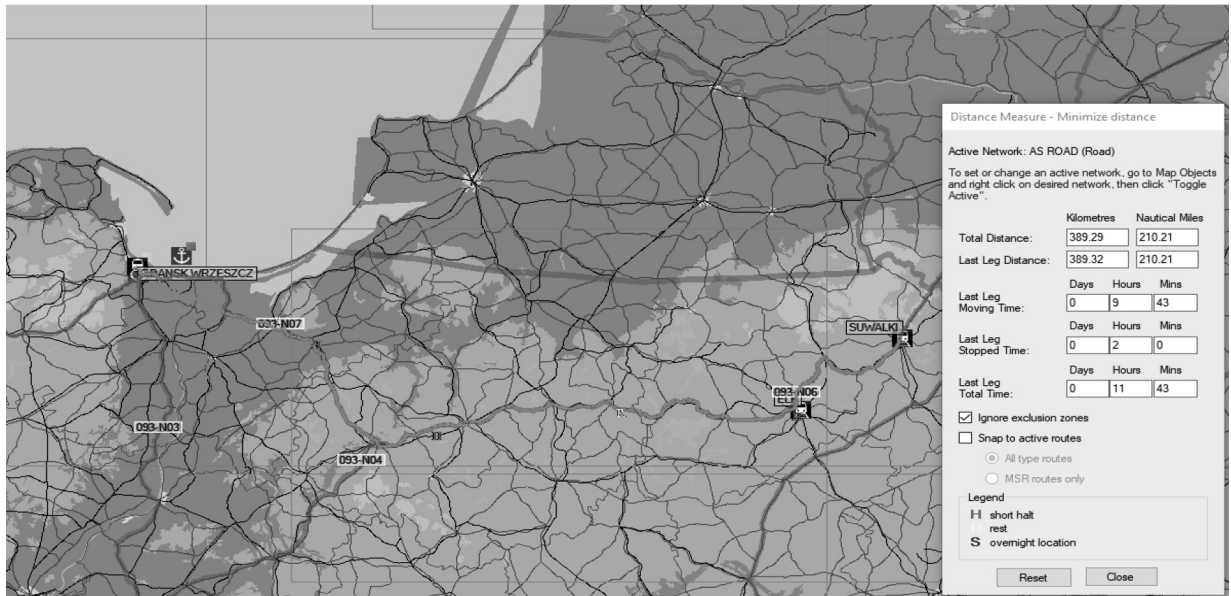
Figure 3. Analysis of transport in the theatre of operations from Gdańsk-Wrzeszcz to Suwałki - default setting

Source: own study

Figure 3 shows that the distance between two points (Gdańsk-Wrzeszcz and Suwałki) along the assigned route is 389,29 km. The route requires a total of three short breaks and one two-hour rest. The total walking time is 11 hours and 43 minutes. In Figure 3, the system automatically outlined the proposed places for a short stop (letter H) and rest (letter R).

The stopping times, vehicle speeds, loading, unloading and further data are specified in the *planning parameters* (Fig. 4).
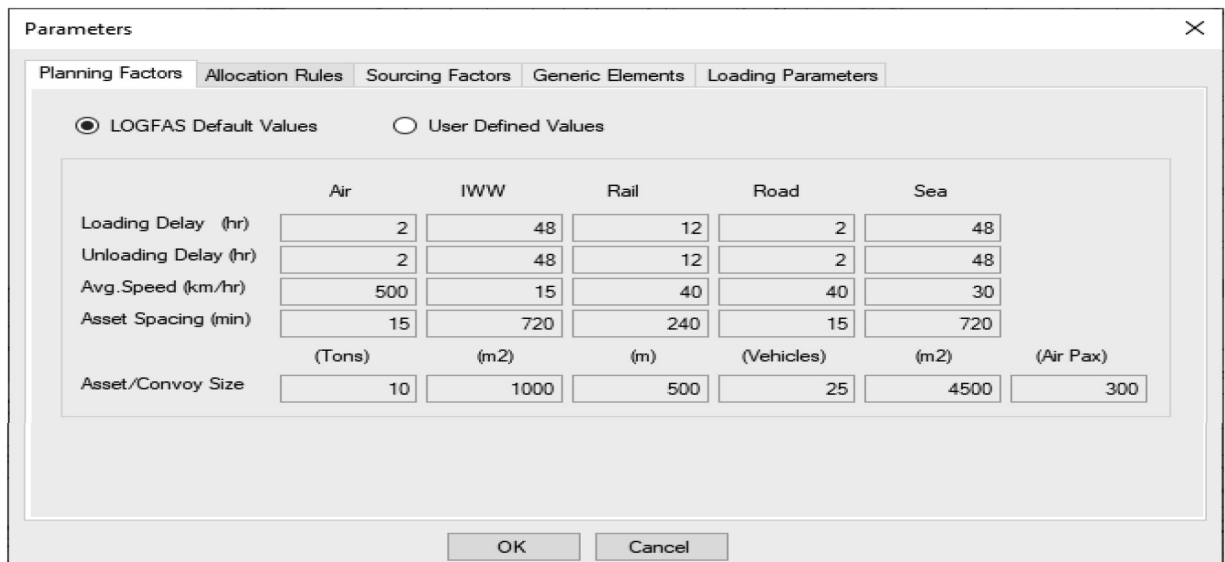
Figure 4. Transport parameters, default settings

Source: own study

According to the information in Figure 4, it is possible to assign your own transport parameters or leave the default. This allows for precise determination of travel and stop times.

For research purposes, the average speed was reduced from 40 to 20 km/h.

Figure 5. Transport parameters, own settings

Source: own study

The reduction in speed (Fig. 5) automatically led to a change in travel times and stops. This is shown in Figure 6.
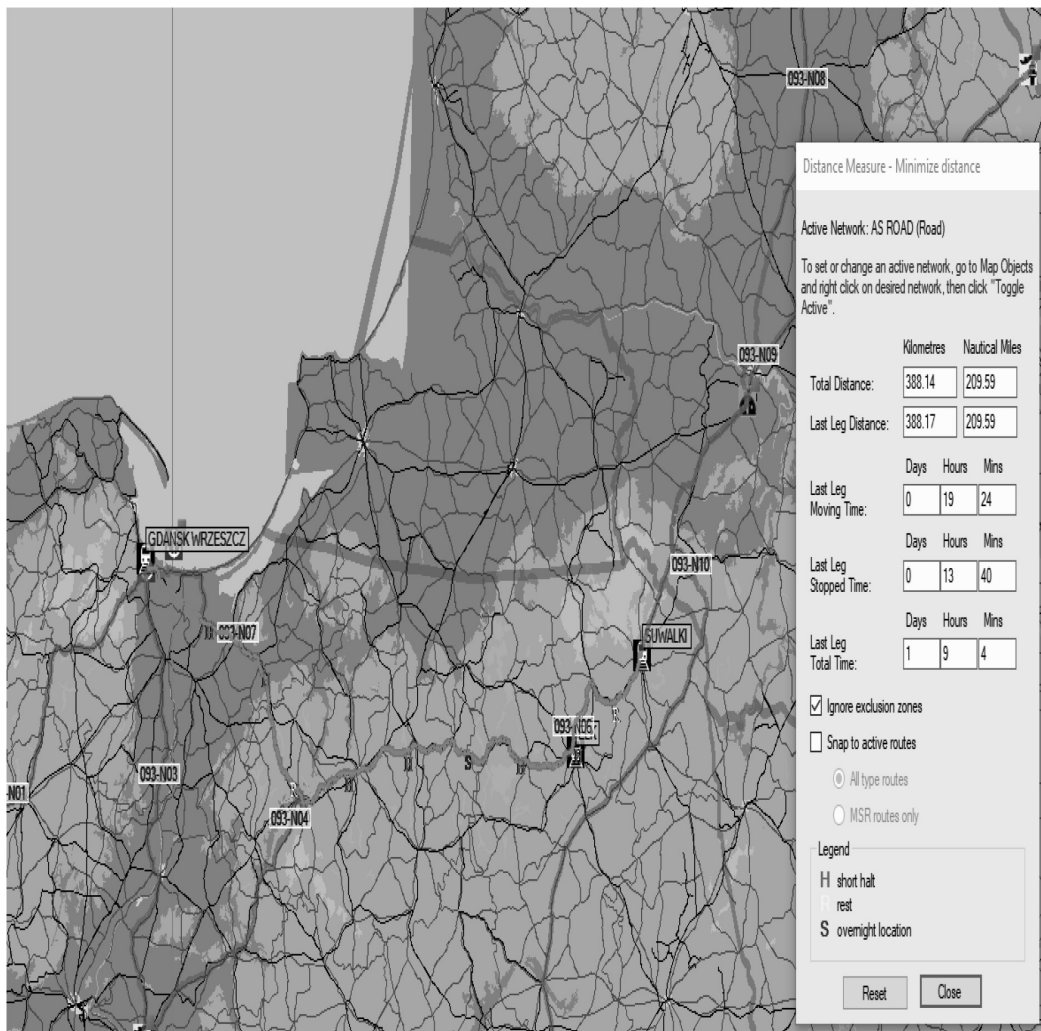
Figure 6. Analysis of transport in the theatre of operations from Gdańsk-Wrzeszcz to Suwałki, own settings

Source: own study

According to the observation of the march shown in Figure 6, the project requires 1 day 9 hours and 4 minutes of travel time. This in turn requires four short stops (H) and one longer stop (R) and an overnight stay (S) on the first day. On the second day, two stops are required (H).

At this stage, it is important to carefully analyze the GEOLOGS points in the vicinity of places such as H, R and S. Thanks to this, it is possible to provide the subunits with appropriate infrastructure, for example, beds and toilets.

The CORSOM module allows for the analysis and evaluation of moving means of transport (Fig. 7).
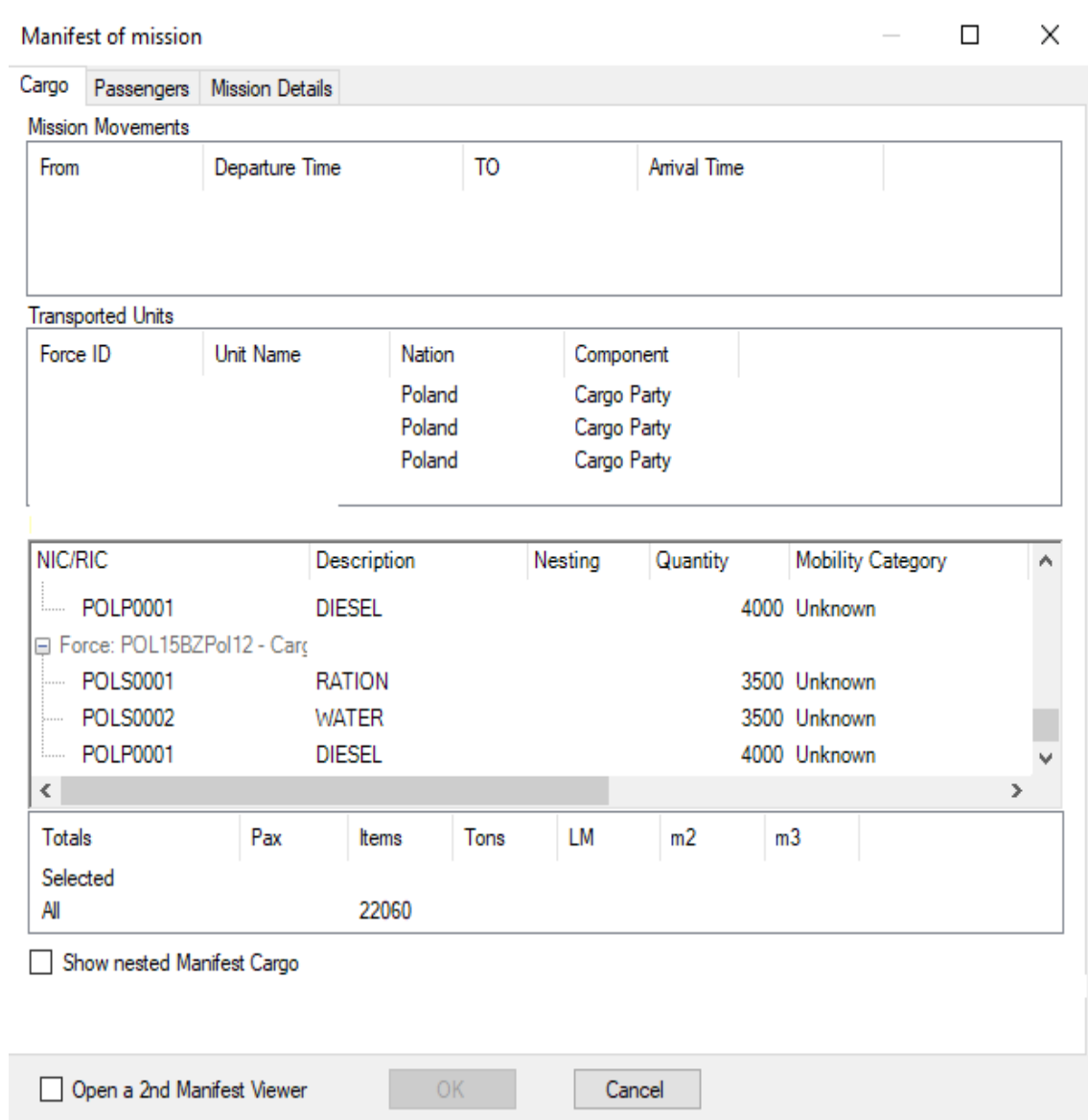
Figure 7. Analysis of the material transport

Source: own study

Figure 7 presents a list of packed supplies transported according to the information in the DDP.

The CORSOM module allows for the dynamic management of missions from anywhere in the world, both by road, rail and air transport. For illustrative purposes, a new network was drawn and a mission from Warsaw to Babimost was built (Fig. 8).

Figure 8. Mission analysis in the CORSOM module

Source: own study

The CORSOM software enables the analysis of missions in terms of: time, loading, place, mission categorization (pax, cargo and others) as well as the type of transported supplies and their parameters.

In this software, it is possible to visualize transport on a map. An example of the movement of respective convoys is shown in Figure 8.
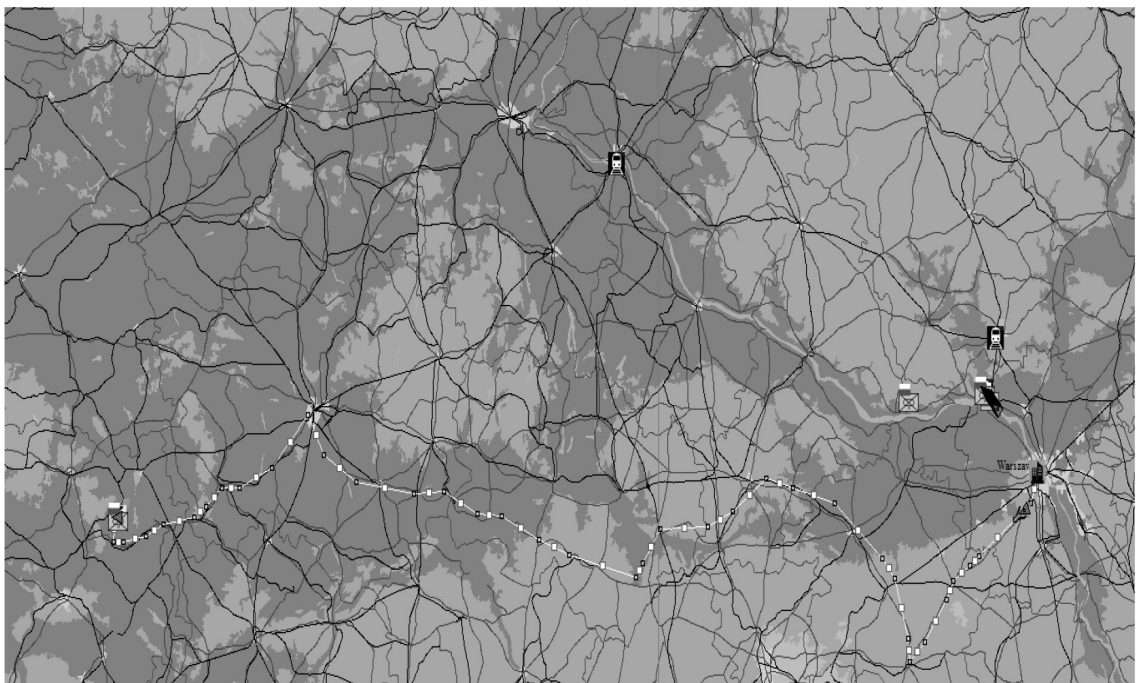

Figure 9. Movement of convoys in the CORSOM module

Source: own study

Figure 9 shows the transport of convoys along the assigned route. The operator can view the content of respective means of transport, it is also possible to reload them.

Summarizing the transport planning in LOGFAS modules, they are an effective tool for the management of *home station* transport via *port of debarkation* (PoD) to *final destination* .

4. Summary and conclusions

The data entered into the software allowed for the simulation of road transport of the subunits in the LOGFAS environment. Thanks to the tool used, the travel times were determined at the assumed speeds. Information was obtained on short and long stops and overnight stays. This shows that the purpose of the study has been achieved.

The programme offers many possibilities in terms of the management of the entire transport of subunits. LOGFAS allows to plan various types of transport, including road, rail, sea and air, as well as manage its respective elements. It also allows to obtain a lot of valuable information that can improve the entire planning and change it flexibly depending on the emerging needs, both in times of conflicts, crisis situations and peace.

The work in the LOGFAS software requires a lot of exercises and practical knowledge as well as numerous specialist information on dimensions, consumption of means of transport, packaging methods and many others. This software can certainly be considered useful and gives an overview of the implementation of respective transport projects.

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